

March 7, 2005

Dr. Barry M. Klein
Vice Chancellor for Research
Davis McClellan Nuclear Radiation Center
One Shields Avenue
Davis, California 95616-8671

SUBJECT: NRC INSPECTION REPORT NO. 50-607/2004-202

Dear Dr. Klein:

This refers to the inspection conducted on November 15-19, 2004, at the University of California, Davis Nuclear Radiation Center. The enclosed report presents the results of that inspection. Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress.

Based on the results of this inspection, no safety concern or noncompliance to NRC requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>. If you have any questions concerning this inspection, please contact Mr. Thomas Dragoun at 610-337-5373.

Sincerely,

/RA/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
New, Research and Test Reactors Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-607
License No. R-130

Enclosure: NRC Inspection Report No. 50-607/2004-202

cc w/enclosures: Please see next page

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Docket No. 50-607

cc:

Mr. Jeff Ching
5335 Price Avenue, Bldg. 258
McClellan AFB, CA 95652-2504

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No: 50-607

Report No: 50-607/2004-202

Licensee: University of California, Davis

Facility: McClellan Nuclear Radiation Center

Location: McClellan Park
Sacramento, California

Dates: November 15 - 19, 2004

Inspector: Thomas F. Dragoun

Approved by: Patrick M. Madden, Section Chief
Research and Test Reactors Section
New, Research and Test Reactors Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of California, Davis
Report No: 50-607/2004-202

The primary focus of this routine, announced inspection was the on-site review of selected aspects of the licensee's Class 1 research reactor program including: radiation protection, effluent control and environmental monitoring, experiments, and inventory of special nuclear material (SNM).

Radiation Protection

- The radiation safety program satisfied regulatory requirements because: 1) surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present; 2) postings met regulatory requirements; 3) personnel dosimetry was being worn as required and doses were within NRC's regulatory limits; 4) use of protective clothing and personnel frisking practices were satisfactory; 5) annual reviews of the Radiation Protection Program were being completed by the licensee as required by 10 CFR Part 20; and 6) personnel training provided for access to various areas of the facility was acceptable. Major changes to the program were underway and will be reviewed in a future inspection.

Effluent Control and Environmental Monitoring

- The licensee's effluent control and environmental monitoring program was conducted in accordance with the requirements in Technical Specification 6.4.2(d) and 10 CFR Part 20. Monitoring results demonstrate that doses to the public from effluent releases were below the NRC regulatory limits.

Experiments

- The program for experiments satisfied Technical Specification and procedural requirements.

REPORT DETAILS

Summary of Plant Status

The licensee's two megawatt TRIGA research reactor was operated 16 hours (two shifts) per day, 5 days per week, in support of neutron radiography, medical isotope production, neutron tomography, experimental sample irradiation, and reactor operator training.

1. Radiation Protection

a. Inspection Scope (Inspection Procedure (IP) 69012 and TI 2800/035)

The inspector reviewed the following regarding the licensee's radiation protection program to ensure that the requirements of 10 CFR Part 20 and Technical Specification (TS) 6.4.2 "Health Physics Procedures" were being met:

- Safety Analysis Report, Revision 4, dated December 1999, Chapter 11, "Radiation Protection and Waste Management Program" Revision 2, dated April 3, 1998
- Draft report of findings by the Nuclear Safety Committee (subcommittee) during the annual inspection conducted on August 19, 2004
- Training and experience of three new NSC committee members and the new chairperson
- Memorandum to MNRC Director, M. Slaughter, from L. M. Bosworth providing the results of a health physics program assessment conducted on June 22-23, 2004
- American National Standard ANSI/ANS-15.1-1990, "The Development of Technical Specifications for Research Reactors"
- American National Standard ANSI/ANS-15.11-1993, "Radiation Protection at Research Reactor Facilities"
- Lesson plan, training objectives, and qualification card for "Radiation and Contamination Survey Qualification" presented to Senior Reactor Operators (SRO) by the Radiation Safety Officer (RSO)
- Procedure "Unrestrictive Release of Materials" Revision 9, undated
- Document "What HPs Do," a summary list of routine tasks and periodicity required by the radiation protection program compiled by the RSO
- The "Self Inspection Checklist" completed by the RSO on July 13, 2004
- Procedure "Radiation Safety Training for UCD/MNRC Personnel" Revision 8, undated
- Sign-in records for students with "B" level access for calendar year 2004
- Procedure "Radiation Survey Procedures", Revision 10, undated.
Appendix A, "Required Radiation Surveys for the MNRC Facility"
Appendix B, "Required Contamination Surveys for the MNRC Facility"
- Daily smear records for September 2003 to June 2004. Weekly smear records for September, October, and November. Quarterly smear results for fourth quarter 2003. Random radiation level results for the past two years

The inspector also toured the facility and observed the use of dosimetry and radiation monitoring equipment. Licensee personnel were interviewed and radiological signs and postings were observed as well.

b. Observations and Findings

The new UCD/MNRC Director began his tenure on June 1, 2004. He indicated that prior to assuming the responsibilities of the position, he completed an independent evaluation of the radiation protection program. On November 1, 2004, he initiated major changes to the radiation safety program that were anticipated to take about 60 days to implement. This NRC inspection occurred at approximately the mid point of the project. Some changes already completed included:

- All HP technicians were let go, resigned, or transferred. They will not be replaced.
- The Health Physics Supervisor position was eliminated and replaced by the Radiation Safety Officer (RSO). The RSO is tasked with all activities previously completed by HP Technicians along with any HP Supervisor legacy duties. The RSO is the primary individual representing the radiation safety program at this facility.
- Approximately nine technical personnel (reactor operators, health physics staff, and Q/A staff) have left or were let go since the last NRC HP program inspection. Two financial accounting staff and one research/ education coordinator were added to the staff.
- The RSO was also designated as the Environmental Health and Safety Officer as a collateral duty. This involves the implementation of the Universities' HAZMAT program.

In addition to the routine duties, the RSO was revising the HP procedures and policies to reflect the changes initiated by the Director. He also was developing and delivering the training to the reactor operators and radiographers to perform surveys previously done by technicians. This transfer of responsibility for radiation surveys to the workers is anticipated to reduce the workload on the RSO. The changes to provide improved radiation protection of the workers and the public will be reviewed in a future inspection (IFI 50-607/2004-202-01).

(1) Surveys

Radiological conditions in the controlled areas were surveyed on the procedurally specified schedule using appropriate portable radiation detection instruments. Survey records were maintained as required by TS 6.8 "Records" and 10 CFR Part 20 Subpart L.

(2) Postings and Notices

Observation of warning signs and postings during tours of the controlled areas indicated that the postings were appropriate for the radiological

conditions found during the surveys and met the requirements specified in 10 CFR 20.1901 and 20.1902.

(3) Dosimetry

Personnel were observed properly wearing extremity and whole body dosimetry in the controlled areas. The dosimeters were 4 chip thermoluminescent variety processed monthly by a NVLAP certified vendor (Global Dosimetry). The reported dosimetry results indicated that personnel doses were controlled to levels below the NRC limits specified in 10 CFR 20.1201.

(4) Protective Clothing

Protective clothing was properly used in contaminated areas. Exit surveys (frisking) had been required at four exit locations using automated, sensitive hand and foot monitors. Since no contamination has been detected in certain areas, three of the four automatic frisking stations were turned off. Access to the equipment room will continue to require use of protective clothing and automatic frisking on exiting the area due to the presence of loose contamination.

(5) Radiation Protection Program

The radiation protection program was described and controlled by procedures and policies that were well documented as required by TS 6.4.2. "Health Physics Procedures" and 10 CFR 20.1101(a) "Radiation Protection Programs." Annual audits were completed by the RSO on July 13, 2004, and the Nuclear Safety Committee on August 19, 2004, which satisfied the periodic program review required by 10 CFR 20.1101(c). No problems were identified and a few recommended improvements were suggested.

(6) Personnel Training

Personnel training required by 10 CFR 19.12 "Instruction to Workers" was provided by the RSO. In the graded approach, there were five "levels" of training, labeled "A" to "E", which depended on which controlled areas would be entered. The training included a written exam. A review of the sign-in log for personnel with "B" level access (mostly students) indicated that the access controls were effective.

c. Conclusions

The inspector determined that, because: 1) surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present; 2) postings met regulatory requirements; 3) personnel dosimetry was being worn as required and doses were within NRC's regulatory limits; 4) use of protective clothing and personnel frisking practices were satisfactory; 5) annual reviews of

the Radiation Protection Program were being completed by the licensee as required by 10 CFR Part 20; and 6) personnel training required for access to various areas of the facility was acceptable, the radiation safety program satisfied regulatory requirements. Major changes to the program were underway and these changes will be reviewed in a future inspection. Changes requiring revisions of the policies and procedures that define the program will also be inspected.

2. Reactor Effluent and Environmental Monitoring

a. Inspection Scope (IP 69004)

The inspector reviewed the following to determine if the licensee's effluent controls and environmental monitoring program have been effectively maintained to meet regulatory requirements including the 10 CFR Part 20 constraint limit, TS Limiting Condition for Operation (LCO) 3.7 "Reactor Radiation Monitoring System," LCO 3.7.2 "Effluents - Argon 41 Discharge Limit", and TS 4.7 "Reactor Radiation Monitoring Systems":

- Procedure "Environmental Radiation Monitoring Procedures", Revision 12, undated
- Procedure "Radioactive Effluent Monitoring Procedures" Revision 11, undated. Data of the daily operability check of the 4 Continuous Air Monitors (CAM) recorded in the Health Physics Daily Log
- Annual reports for 2002 dated June 26, 2003, and 2003 dated June 28, 2004
- Quarterly environmental TLD results for 2003 including the 21 outer ring locations (base perimeter), 19 inner ring (reactor site boundary) locations, and 7 remote locations serving as reference background

b. Observations and Findings

The effluent control and environmental monitoring programs have changed significantly under direction of the new reactor Director. The measurement of ambient radiation level and airborne sampling at some of the environmental survey locations during the monthly change out were ended. All locations were retained but will only be equipped with thermoluminescent (TLD) dosimeter which will continue to be collected monthly.

The monitoring and control of effluents from facility has been conducted in accordance with licensee procedural requirements. Data recorded by these systems and data from the field locations demonstrate that control of effluents has been satisfactory.

c. Conclusions

The licensee's effluent control and environmental monitoring program was conducted in accordance with the requirements in the TS 6.4.2(d) and 10 CFR

Part 20. Monitoring results demonstrate that doses to the public from effluent releases were below the NRC limits.

3. Experiments

a. Inspection Scope (IP 69005)

The inspector reviewed the following records to determine if the requirements in TS 6.5 "Experiment Review and Approval" and 10 CFR 50.59 "Changes, Tests, and Experiments" were satisfied:

- Procedure MNRC-0043-DOC-03 "Facility Modification" and the included Facility Modification Checklist
- Memo to Dr. D. M. Slaughter from ERB Chairman, "ERB Review of Natural U Foils Irradiation in the Pneumatic Transfer System" dated September 15, 2004, which approved the experiment. Attachments included:
 - "UCD/MNRC Irradiation Summary Form" dated complete on September 21, 2004
 - Memo from the Secretary of the Experiment Review Board (ERB) to Experiment Review Board Chairman
 - "UCD/MNRC Experiment Request Form" signed on October 4, 2004
- Memo to Dr. B. Klein from ERB Chairman dated March 11, 2004, Subject: "Experiment Review Board Review of INAA of Basalt Using the Central Irradiation Facility"
- MNRC Experiment Request Form, signed March 19, 2004, provided review and approval for experiment K-4-44 (INAA of basalt)
- Facility Modification Checklist for "Install Radioiodine Isokinetic Probe in the Stack" modification number FM-III-03-02. A 10 CFR 50.59 screening of this change was completed September 29, 2003
- Memo to UCD/MNRC Director from Health Physics Supervisor, subject: Modification Review Committee Meeting dated August 8, 2003

b. Observations and Findings

The processing of experiments through the review and approval protocols was the responsibility of the Health Physics Supervisor, a position that no longer exists. The new RSO anticipates that he will continue to coordinate experiments and the reviews and oversight at the facility unless advised otherwise.

The documents reviewed were for three proposed experiments that were never conducted at this facility. The reviews were done in a technically thorough manner. A 50.59 screening recorded the considerations and back up data that supported the affirmative or negative result for a screening question. All records of the review process were readily available and demonstrated that the appropriate controls, procedural requirements, and limitations were implemented.

c. Conclusions

The program for experiments satisfied TS and procedural requirements.

4. NRC Bulletin 2003-04

The NRC sent Bulletin 2003-04, dated October 8, 2003, to all licensees authorized to possess special nuclear material (SNM) with a request to conduct an inventory of quantities in their possession. Instructions were provided on the identification of materials of concern. The requested action was to be complete within 90 days of receipt of the Bulletin. This effort was required to update the data maintained in the Nuclear Materials Management and Safeguards System (NMMSS) system operated by a contractor for NRC and DOE. The inspector compared the data submitted in response to the Bulletin with the last two routine biannual reports filed with NMMSS. No deficiency was noted.

5. Exit Interview

The inspection scope and results were summarized on November 18, 2004, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Berg	SRO, Special Nuclear Material Officer
J. Ching	Health Physics Supervisor
M. Slaughter	Director

INSPECTION PROCEDURE USED

IP 69004	CLASS I NON-POWER REACTORS EFFLUENT AND ENVIRONMENTAL MONITORING
IP 69005	CLASS I NON-POWER REACTOR EXPERIMENTS
IP 69012	CLASS I RESEARCH AND TEST REACTOR RADIATION PROTECTION
TI 2800/035	Verification of Licensee responses to NRC Bulletin 2003-04

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-607/2004-202-01	IFI	Review changes to licensee's radiation protection program.
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Closed

None

PARTIAL LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
HAZMAT	Hazardous Material
HP	Health Physics
IP	inspection procedure
LCO	Limiting Condition for Operation
MNRC	McClellan Nuclear Radiation Center
NMMSS	Nuclear Material Management and Safeguards System
NRC	Nuclear Regulatory Commission
RSO	Radiation Safety Officer
SNM	Special Nuclear Material
SRO	Senior Reactor Operator
TLD	thermoluminescent Dosimeter
TI	Temporary Instruction
TS	Technical Specifications
UCD	University of California, Davis